

**GOOD CONGRUENCE BETWEEN MORPHOLOGY AND MOLECULAR PHYLOGENY OF HADROMERIDA, OR HOW TO BOTHER SPONGE TAXONOMISTS.** *Memoirs of the Queensland Museum* 44: 100. 1999:- Within Demospongiae, the order Hadromerida is well defined and there is a strong consensus among systematists about its composition and validity. This order is characterised by the presence of tylostyles radially arranged at least in the periphery, and by microscleres, when present, of the aster type. All Hadromerida are oviparous and the choanocytes have a periflagellar sleeve. Ten families are without any doubt attributed to Hadromerida, six of which with microscleres of the aster type and four of which without microscleres.

The first work on molecular phylogeny of Porifera was made on the Hadromerida (Kelly-Borges, Bergquist & Bergquist, 1991). The molecule used was the 18S rRNA, which appeared to be not sufficiently informative to resolve the phylogeny at that taxonomic level.

In this work we have used the 5' end of the 28S rRNA (about 1000bp) to explore the internal phylogeny of this order. 15 species belonging to 12 genera and 8 families were sequenced. Five outgroup species were sequenced belonging to Axinellida, Tetractinellida, and Halichondrida. Parsimony and Neighbor-Joining analyses have been done. Trees were rooted by using Tetractinellida (*Cinachyrella* and *Discodermia*) as a monophyletic outgroup. Both analyses (Parsimony and Neighbor-Joining) show that the Hadromerida are composed of four monophyletic taxa. Taxon 1 is composed of 6 species belonging to the Spirastrellidae, Acanthochaetidae, Clionidae, and Placospongiidae. All these families have microscleres of the spiraster-type. Taxon 2 is composed by 5 species of Timeidae and Tethyidae. These two families have microscleres of the euaster-type. Taxon 3 is composed of only one species *Polymastia mamillaris* belonging to the family Polymastiidae, which has no microsclere of aster type. The validity of this taxon has to be checked with other genera belonging to the Polymastiidae family. Taxon 4 is composed of three Suberitidae and an external species *Halichondria panicea*, which belongs to the family Halichondriidae (order Halichondrida). Neither the

Suberitidae nor the Halichondriidae have microscleres of the aster type. The monophyly of each of these four taxa is well supported with high bootstrap proportions. The monophyly of the four taxa together is also well supported but the relationships between them cannot be ascertained.

The monophylies of taxa 1 and 2 are congruent with morphology, both taxa corresponding to the hadromerid families with spirasters and with euasters, respectively. An important and unexpected problem of classification appeared with taxon 4. The result obtained with our sequence of *Halichondria panicea* was confirmed with a shorter sequence of *Hymeniacidon heliophila* available in GenBank. When the sequence of *Hymeniacidon* is included, taxon 4 remains monophyletic and strongly supported by BP. From the morphological and cytological point of view there is no synapomorphy between the two groups. The Halichondrida are defined mostly by negative characters. However, we observed a fine morphomolecular synapomorphy for taxon 4. This is the loss of a small loop of 15 bp in the secondary structure of the D2 domain, which is probably the result of only one deletion event. From the chemical point of view, there is another synapomorphy: a large amount of stanols have been described both in the Suberitidae and the Halichondrida.

The best hypothesis seems to reallocate Halichondriidae to the Hadromerida. The order Hadromerida remains monophyletic. With the exception of this reallocation the classification obtained with 28S rRNA is perfectly congruent with the existing classification. All the families are monophyletic. We propose a subordinal classification: Spirastrellina, Timeina, Polymastiina and Suberitina. □ *Porifera, Demospongiae, molecular phylogeny, 28S rRNA, Hadromerida, Halichondrida, monophyly.*

*Catherine Chombard (email: gdretudi@mnhn.fr), Service de Systematique Moleculaire (CNRS GDR 1005), Muséum National d'Histoire Naturelle, 43 rue Cuvier, 75005 Paris, France; Nicole Boury-Esnault, Centre d'Océnologie de Marseille, Station Marine d'Endoume, Université de Aix-Marseille 2 URA-CNRS, 41Rue de la Batterie-des-Lions, F-13007 Marseille, France; 1 June 1998.*